

A CLINICAL AND HISTOLOGICAL STUDY OF
CERTAIN ADENOCARCINOMATA OF
THE BREAST:

AND A BRIEF CONSIDERATION OF THE SUPRACLAVICULAR
OPERATION AND OF THE RESULTS OF OPERATIONS
FOR CANCER OF THE BREAST FROM 1889
TO 1898 AT THE JOHNS HOPKINS
HOSPITAL.¹

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In this communication I ask attention to the description of one or two quite rare but definite varieties of breast cancer, which we have encountered in the Johns Hopkins Hospital with sufficient frequency to enable us to recognize them clinically as well as histologically.

We have truly a cancer storehouse, for we save all of our malignant tumor material. In breast cases, the entire mass—fat, muscle, and all—is saved. Before it is severed from the body, in the course of the dissection, ligatures, black and white, are placed in it, here and there, as landmarks. When a flap of skin is to be dissected back its tip is left *in situ*, as a bearing point on the tissues to be removed. If by accident or design a scrap of tissue is dissected during the operation from the tumor mass it is at once labelled. When we are in doubt as to the cancerous involvement of the minute gland at the highest reachable point below the clavicle, it is sometimes dissociated by a special ligature. In making the inci-

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sions for the macroscopic examination of the tumor the best interests of the microscopic work are considered. We are, if possible, more fully convinced than ever of the value of painstaking scrutiny of the naked-eye appearances, and of detailed descriptions of all that can be seen on the freshly cut surfaces of the tumor and of the appearance and relation of the outlying parts. We have had occasion to regret the fact that the macroscopic findings have been insufficiently portrayed in some few of our earlier cases.

The block dissected from the neck, and eventually from the mediastinum, should be oriented, before hardening, as accurately as the main mass. The tissues should be hardened in Müller's or Zenker's fluid rather than in formalin or alcohol. If formalin should seem desirable in some special case, it might be used for three or four hours, after which Müller's fluid is to be substituted. Formalin interferes with the differentiation of elastic tissues by the orcein stain (E. Goldmann, *Beiträge zur klinische Chirurgie*, Band xviii, p. 595).

One person should be responsible for the preservation of the breast material from first to last. This was no light responsibility, even when the material was not nearly so abundant with us as it is at present.

Above all, the operator himself should study the material, in the operating room, immediately after the operation, and in the laboratory.

There is a gap between the surgeon and pathologist which can be filled only by the surgeon. The pathologist seldom has the opportunity to see diseased conditions as the surgeon sees them. A tumor on a plate and a tumor in the breast of a patient, how different! Its blood, its color, its form, its freshness, its consistency, are more or less lost when the tumor has been removed; the translucent zone of certain rapidly-growing cancers soon becomes opaque. Furthermore, the gross appearance of the new growth has for the surgeon a vital interest. He must decide at the operating table not only what is to be done at the moment, but he

should be able to give a more or less accurate prognosis. If there is a difference in the malignancy of malignant tumors, the operator, above all others, is the one to whom we should look for its interpretation. Not only are his opportunities greater than the pathologist's, but the incentive for the study of the fresh as well as of the hardened specimen is infinitely greater.

The patient's first impressions of the tumor, the presence or absence of pain at the beginning, the gradual increase of pain from almost imperceptible beginnings, the life of the new growth, the gradual disappearance of the fat between tumor and skin, the discoloration of the skin over the tumor or in its neighborhood, the local changes in the venous, arterial, capillary, and lymphatic circulations, the involvement of the skin and of the parts underlying the tumor, the shape and appearance of the tumor, the condition of the nipple as compared with its fellow, the gradual shifting of nipple (it may reach the axillary line), the comparison of the two breasts, of the axillæ, of the supraclavicular fossæ and of the groins, the circulation of the arm of the affected side, the involvement of the skin by metastases of the pleura, bones, and viscera, etc., these are some of the conditions which interest the operator more than the pathologist, and may assist him ultimately in connection with his study of the new growth itself to make some sort of a classification of breast cancers, and to determine their relative malignancy.

That breast cancers are not all alike every clinician knows; to some the patient succumbs in a year or less, others are borne for twenty years or more.

I know of no very successful attempt at classification of cancers of the breast with reference to their relative malignancy, and yet the importance of such a classification, if it were to any extent possible, is so evident that it is unnecessary to emphasize it. The histories alone of the operated as well as the unoperated cases give one a hint that there must be some basis for such a classification.

Many cancers of the breast contribute little if anything to the size of the organ, but some, certain adenocarcinomata and encephaloid cancers, for example, form tumors with considerable dimensions; the former may exhibit a slight tendency to pedunculation.

I find myself becoming inclined to welcome largeness, a suggestion of constriction at the base of cancers of the breast, and a tendency to break down as relatively favorable signs.

It would seem that we have been fortunate in meeting with a number of unusual adenocarcinomata, some of which have, perhaps, never been described; they may, however, have been seen and even described, but described beyond recognition. I have read long and careful descriptions of the minute appearances of tumors which might be interpreted to mean almost anything. If drawings were to be made by several individuals based on some of these descriptions, I doubt if any two of them would depict the same thing.

The particular adenocarcinomata which are so full of interest for us at this time, and to which I shall first call attention, I do not find described; and yet they are not so very uncommon. We have encountered five or six of them in less than 150 cases of breast cancer.

Permit me to proceed at once to a very brief consideration of these cases:

CASE I.—*Malignant Adenoma (Adenocarcinoma)*.—Surg. No. 6286; Path. Lab. No. 1705. Mrs. L. M., white, aged sixty-seven years, presented herself February 16, 1897, with a tumor growing in the site of a scar over the right breast. Two and one-half years before admission the patient struck her right breast in a fall; one month thereafter she noticed in this breast a little lump, the size of a pea, just under the skin. Within a year the tumor grew, painlessly, to be as large as a fist. Eight months before admission the tumor was removed by a local surgeon. At that time the skin over the tumor was bluish but not broken. Since the operation there has been a rapid recurrence of the tumor,



PLATE I.—Recurrent adenocarcinoma of the breast.



PLATE II.—(A) Adenocarcinoma of the breast.

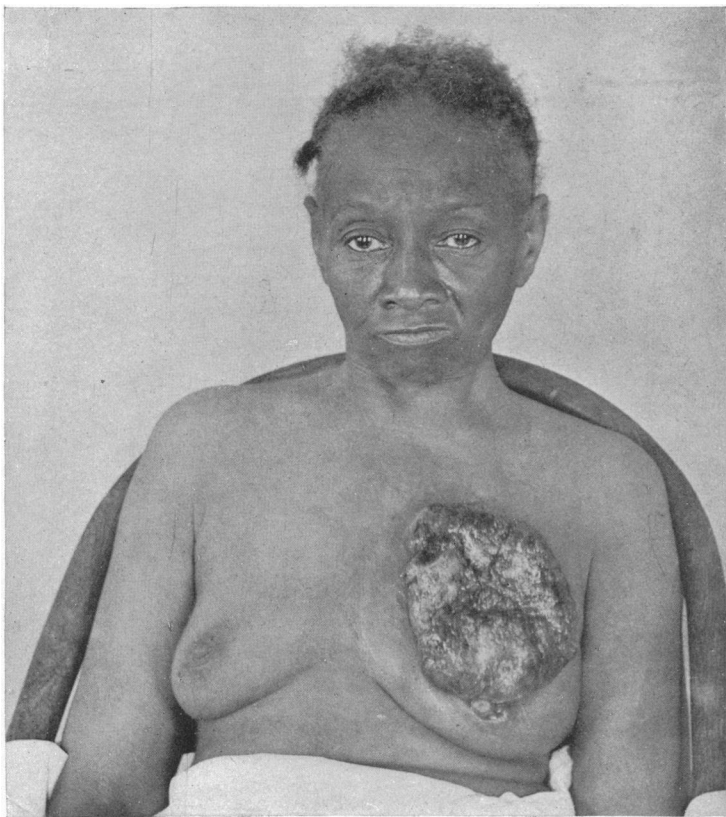


PLATE II.—(B) Adenocarcinoma of the breast.

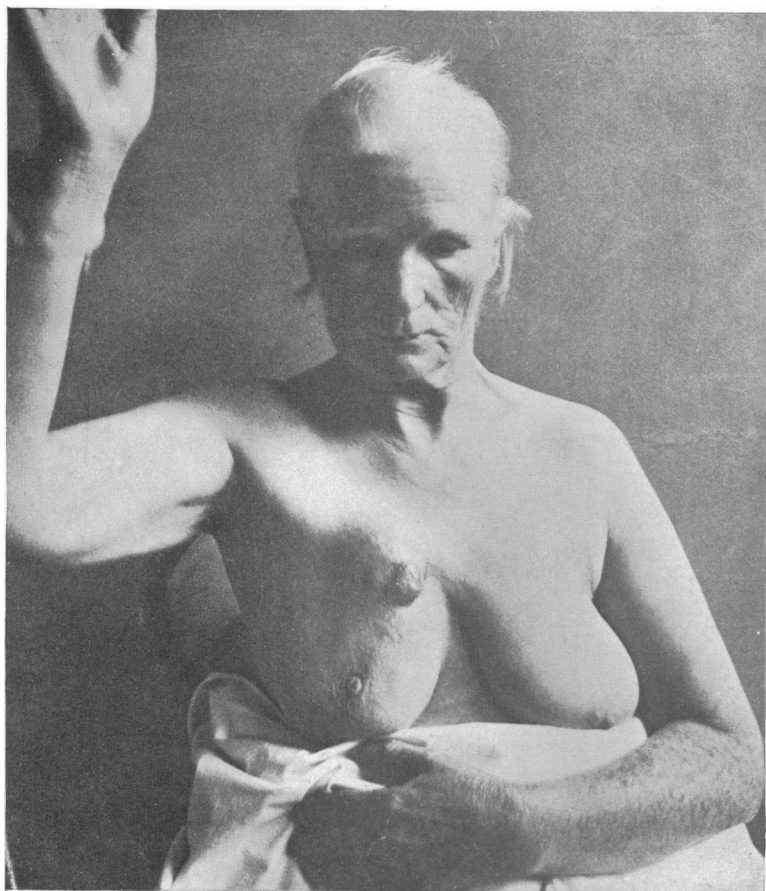



PLATE III.—Adenocarcinoma of the breast.

associated with occasional sharp-shooting pains. There has been no loss of weight or strength.

 This patient was presented to me for the first time at my clinic, where I discussed the tumor, at length, before the class. It was a fungating tumor, pedunculated, and occupied the lower portion of the scar. There was also a small nodule in the upper end of the scar. (See Plate I.)

The entire convex surface of the tumor was ulcerated. One could squeeze a serum-like fluid from the tumor, the surface of which was covered by a necrotic film. I told the class that the tumor was certainly not an ordinary carcinoma, because of the considerable pedunculation, the peculiar serous fluid, the consistence of the tumor, etc. It was softer than the ordinary carcinoma of the breast, considerably softer everywhere except in one place, and this particular place, which was harder and could not macroscopically be distinguished from carcinoma, proved microscopically to be an adenocarcinoma in which the cells had already ceased to form any very definite combination figures. The tumor was removed at this same clinic by Dr. Finney, and the axilla was dissected out in the usual way. The glands in the axilla were enlarged, but careful microscopical examination of several of them has thus far failed to furnish evidence of carcinomatous involvement. The enlargement was due chiefly to endothelial proliferation.

That these glands were not carcinomatous, notwithstanding the fact that this was a recurrent tumor, would, in itself, have been very strong presumptive evidence that the tumor was not an ordinary carcinoma. Plate IV represents one microscopic field of this tumor. You will see at once how very different it is from any of the carcinomata of the breast which are described by the authors. Please observe that the tumor is made up chiefly of very large tubes which are lined with epithelium many cells deep.

In some of the tubes these epithelial cells might seem, at first sight, to be disposed without attempt at arrangement,

but a second glance discovers cell-combinations which have resulted in the formation of gland-like figures, circles, tubes, columns, and minute papillæ. The cells are often so snugly fitted together in these heavily lined tubes (or heavy tubes) as to conceal the original figures; but almost always, even when the tubes are completely filled with tightly packed cells, one can detect little circles of cells or little tubes which betray the tendency and the ability which the cells still have to form definite combinations. (See Plate IV.) Sometimes columns and circles anastomose in such a way as to form a mesh of more or less open net-work when there is room enough for such figures.

In certain parts this tumor has become pure carcinoma and has lost its adenomatous type; the epithelial cells, having lost their power to form combinations, lie irregularly and closely packed together in lymph-spaces.

Last September this patient wrote us that she was perfectly well, and that she was unable to detect any sign of a local recurrence of the tumor.

Sometimes the carcinoma and this peculiar adenoma, with its large, heavily lined tubes, seem to be growing side by side and independently, the carcinoma infiltrating the stroma, we might say, of the adenoma and suggesting, for the moment, a bitypic form of tumor. This bitypic form of growth characterized certain parts of the tumor in the following case:

CASE II.—*Malignant Adenoma (Adenocarcinoma)*.—Surg. No. 3175; Path. Lab. No. 511. Mrs. Mary P., colored, aged fifty years. Admitted June 14, 1894, with a large fungating mass measuring twelve centimetres by fourteen centimetres in the upper and outer quadrant of the left breast. (See Plate II, *A* and *B*.) Three years before admission patient first noticed a small nodule in this breast which has been growing steadily and painlessly ever since. For nearly two years the skin remained intact. Since September, 1893, nine months prior to admission, there have been frequent hæmorrhages from the surface of the

growth, caused, probably, by the sticking of the dressings. A thin, sanious, foul-smelling fluid constantly exudes from the surface of the mass. The edges of the tumor overhang the skin for about one to two centimetres on all sides. There was evidence of cancerous involvement of the neck of the uterus; nevertheless a complete breast operation was performed. The prognosis, so far as local recurrence was concerned, was unusually favorable; the axilla was not involved; the enlarged lymphatic glands showed endothelial hyperplasia.

When we state that an axilla is not involved, we mean that every gland and all of the fat having been exhaustively examined with the microscope, no evidence of cancer has been discovered.

The microscope, as I have said, revealed this association of the heavily lined, very large tubules in which the epithelial cells have preserved their ability to make more or less definite cell-combinations, and the small cancer alveoli occupying bitypically, as it were, the stroma of the adenoma. In other tumors and in other parts of this tumor one can see what would be called the transitions in all the desired forms, from the heavy tubes lined with cells in definite combinations to the finest lymph-spaces containing three or four epithelial cells without arrangement. We are often able to trace, even in the metastases of the purer carcinomata, indications of a tendency in the cancer cells to form combinations which recall the gland structure. This patient died of cancer of the uterus, two and one-half years after the breast operation. There was no recurrence of the breast tumor.

The following case does not strictly belong to this group. I introduce it because it presents in places a type of tumor which might, for the present, be regarded as transitional to the adenocarcinomata to which I have invited your attention.

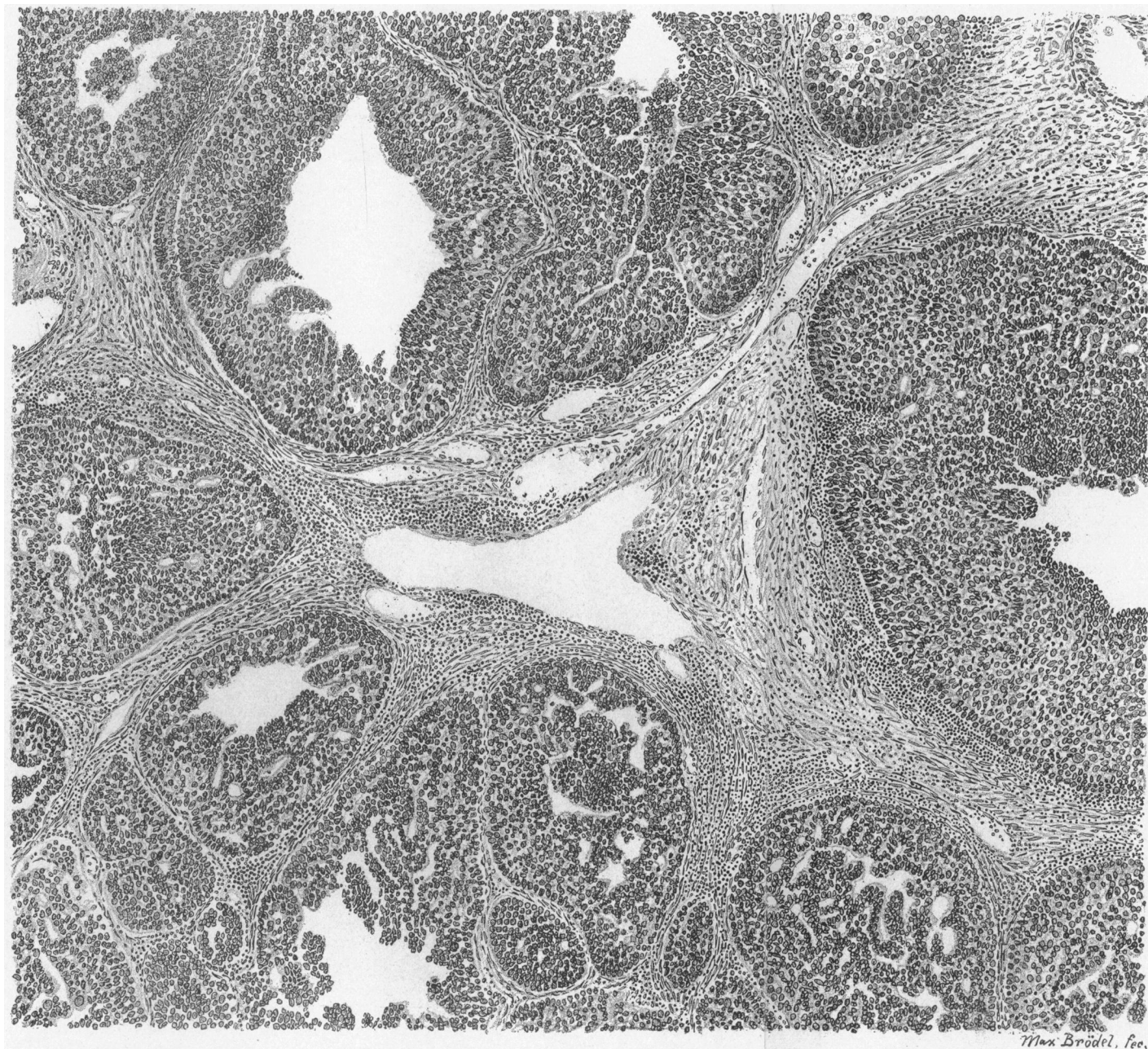
CASE III.—*Scirrhus Carcinoma and Intracanalicular Papillary Adenocarcinoma* ("Duct Cancer").—Surg. No. 6059; Path.

Lab. No. 1611. Mrs. J. M. S., white, aged sixty-one years. Admitted November 30, 1896. Carcinoma of right breast, axilla, and supraclavicular glands. Metastasis in left femur, followed by fracture. Probable local recurrence near sternal edge of scar.

Patient did not suspect that she had a tumor until February, 1896. An increase in the size of the affected breast called her attention to it. She then examined it for the first time, and discovered a hard mass in the neighborhood of the nipple to which the skin was already adherent. She soon began to notice occasional stabbing pains, but otherwise experienced no discomfort from the new growth, which, instead of growing larger, steadily decreased in size from the time when she first discovered it until she came to the hospital. No fluid had ever escaped from the nipple.

On admission, the nipple was tilted upward; the eye detected no tumor in breast, axilla, or neck. The skin covering the breast was not ulcerated, but it was adherent to an underlying mass which could be felt surrounding the nipple. No fluid could be expressed from the nipple. Chart No. 1611 (not here reproduced), which Dr. Cushing kindly painted for me from the fresh specimen, shows the appearance of a section through the nipple and centre of the breast. A number of minute cysts were encountered in this section; two of them, larger than the others, are accurately represented in the colored chart. The largest of these two cysts measured one centimetre in diameter, and was almost filled by a little pedunculated ingrowth. The smaller cyst also contained a minute papilloma. Both of these larger cysts and some of the smaller ones scattered throughout the breast contained a dark and almost black fluid. Minute cysts in other parts of the gland were filled, some with a reddish-brown, some with amber-colored fluid, and some with contents resembling milk, or pus, or cheese. The smallest of these cysts formed hard, shot-like bodies in the breast, which can sometimes be diagnosed by palpation through the skin.

A diffuse scirrhus growth, about three centimetres by three centimetres, in which the larger and many small cysts were embedded, occupied about the centre of the breast and involved the overlying skin and the nipple. It was impos-



Max Brödel, fec.

PLATE IV.—Adenocarcinoma of the breast.

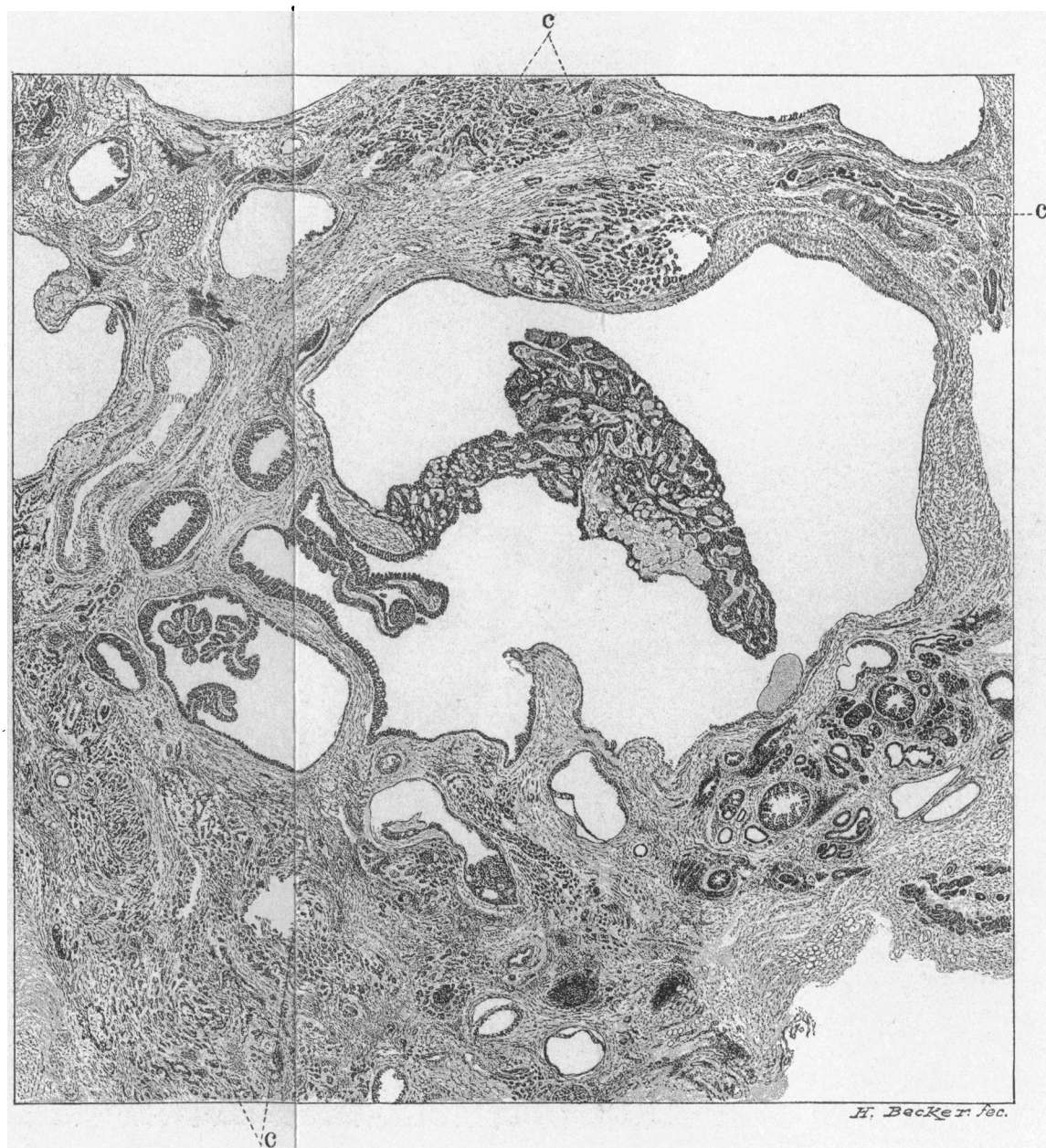


PLATE V.— Carcinoma of the breast, c, c, c, and intracanalicular papillary adenocarcinoma.

sible with the naked eye to determine the limits of this cancer. Dr. Cushing succeeded in cutting and mounting a section of this tumor, which shows the tissues surrounding the cyst, the wall of the cyst, the pedunculated growth, and even the pedicle of the papilloma; and Dr. Hugh H. Young made for me the wall-chart, which represents so beautifully the microscopic appearances. Plate V, drawn by Becker, is a faithful interpretation of the same section. The pedunculated ingrowth is not one of the ordinary varieties of benign intracanalicular papilloma. It has very little stroma; just enough, perhaps, to support the parenchyma. It is chiefly parenchyma, and the epithelial cells form, apparently, combinations similar to those which we have described in the previous two cases,—combinations which result in the formation of the large heavily lined tubes. The pedicle is very delicate, transmitting a few vessels, but consisting chiefly of epithelium many rows deep on the surface, and exhibiting the tendency wherever feasible to form the heavy tubular combinations referred to. In the wall of the cyst, but one or two millimetres from its lining, we meet carcinoma, in which the cells have lost their power to form glandular combinations and appear as ordinary cancer cells incapable of further differentiation. In the glands of the axilla and in the neck were found metastases, most of them undifferentiated cancerous metastases, but some of them revealing the glandular type. This patient died one year after the operation with metastases.

The above case is a true scirrhus cancer, starting probably in the wall of a cyst, and should not be classed with the other five adenocarcinomata; but in Plate V you will observe that the cancer (*c. c. c.*) surrounds a little field of intracanalicular papillomatous adenocarcinoma (the villous carcinoma of Cornil and Ranvier, and the duct cancer of the English surgeons), which recalls in places certain pictures which are familiar ones in the other five adenocarcinomata. Large heavy tubes there are, two or three of them, which

resemble the heavy tubes of the other tumors, but are not precisely like them. There seems to be no tendency in the tubes of the duct cancer to form the rings and other cell-combinations which characterize the other five adenocarcinoma; and there is in this miniature duct cancer, as in all duct cancers, a very conspicuous tendency to produce intracystic villous growths. (See Plate V.)

CASE IV.—*Malignant Adenoma (Adenocarcinoma)*.—Path. Lab. No. 123; Surg. No. 2337. Mrs. M. P., white, aged sixty-five years. Admitted July 7, 1893. Eleven months before admission patient had noticed a tumor the size of a "walnut" in her left breast. On admission this tumor in the upper and outer quadrant measured $4 \times 3 \times 3$ centimetres. It is not adherent to the skin or muscle, and the nipple is not in the least retracted. The complete operation below the clavicle was performed by Dr. Finney. In a note on the macroscopic appearance of a section through the middle of the tumor, Dr. Bloodgood emphasizes the fact that, on pressure of the tumor, a number of long, very fine, soft cylinders were extruded from the cut surface. These were, probably, the partially necrotic centres of the large tubes which I have described.

This was our first case of this variety of tumor. The axillary glands show endothelial hyperplasia, but no metastasis. The tumor was a malignant adenoma of precisely the same variety as those already described; but the type had remained pure, there being no areas of pure carcinoma and no transitional pictures. We had a letter from this patient a few days ago (April, 1898), stating that she was perfectly well, and that, so far as she knows, there is no evidence of local recurrence and none of metastasis.

CASE V.—*Malignant Adenoma (Adenocarcinoma)*.—Path. Lab. No. 204; Surg. No. 2565. Mrs. S. G., white, aged sixty years. Admitted October 18, 1893. Patient stated that five years before admission to the hospital she bruised the right breast badly; three months thereafter she noticed a small lump

in this breast which four years later became adherent to the skin. When operated upon the tumor measured $4 \times 4 \times 3$ centimetres; it occupied the upper part of the upper and outer quadrant of the breast, over the sternal origin of the pectoralis major muscle. It was adherent to the discolored skin and apparently to the pectoral fascia. Plate III, although not a good one, shows at least that the growth was exuberant and would soon have become fungating. At the operation the prognosis was considered favorable, except for the fact that the muscle over the sternal ends of the second, third, and fourth ribs was infiltrated. It was, however, possible to give the local growth a fairly wide berth.

Microscopic Examination.—The tumor involved both skin and muscle, but there was no evidence of metastatic involvement of the muscle or other tissue. The axillary glands were enlarged (endothelial hyperplasia), but metastases have not been found in them.

April 1, 1898, four years and six months after the operation, this patient was examined by Dr. Bloodgood, who reported a perfect result; free use and no swelling of the arm, no sign of recurrence or metastasis, and excellent health of patient.

CASE VI.—*Malignant Adenoma (Adenocarcinoma).*—Path. Lab. No. 994; Surg. No. 4420. E. M., white, single, aged forty-two years. Admitted to the hospital July 15, 1895. One grandparent, one uncle, and one sister died of cancer; the sister with cancer of the breast. Scattered through the breasts are small, hard nodules, from three to five centimetres in diameter; in the left breast, the lower and inner quadrant, is a nodule which is harder and more tender than the rest, and which the patient has noticed for about three months only. This nodule measures about 2×3 centimetres and is freely movable. The skin over the breasts is everywhere normal. The nipples are not retracted. The axillary and inguinal glands on both sides are sufficiently enlarged to be easily felt. July 17, 1895, the complete infra- and supraclavicular operations were performed by Dr. Bloodgood.

The suspected tumor occupied the sternal border of the

lower and inner quadrant of the breast; it was very hard and irregular in outline, not circumscribed, everywhere surrounded by breast tissue; on section it cupped, and from the cut surface, on which could be seen little yellow dots and lines, there could be expressed a soft, rather granular material. The breast tissue on the confines of the tumor differed in appearance from the rest of the gland, being pink in color instead of pearly-white, and studded with minute hæmorrhagic points. Between the nipple and this tumor is a second tumor resembling those found elsewhere in the same breast. On section this little tumor, one centimetre in diameter, instead of cupping, becomes elevated about two centimetres above the surrounding tissue; it is lobulated, and nothing can be expressed from its cut surface. Between this second tumor and the first there are smaller lobulated nodules resembling the main tumor in that a few minute areas of necrosis can be seen and partly expressed. Throughout the breast tissue, both outside of and within the nodules, are little cysts, which are brownish in color and contain a clear fluid.

Microscopic Examination.—The principal tumor is an adenocarcinoma of the large, heavy-walled cylinder type, which we are considering. The axillary glands, macroscopically large and soft and somewhat hæmorrhagic, contain no metastasis. This patient was heard from a few days ago (April, 1898). She reports herself perfectly well, with no sign of recurrence of the tumor, three years and nine months since the operation.

In each one of these five cases we have an adenocarcinoma of a type so distinct that we may advantageously consider them, for the present at least, as constituting a more or less specific class. In Cases IV (123), V (204), and VI (994) we have this adenoma pure throughout the neoplasm; Case VI was operated upon nearly three years ago; Cases IV and V nearly five years ago. Within the last three weeks they have all reported themselves as perfectly well and without a sign of return of the disease. In Case I (1705) the change from the adenocarcinoma to the purer carcinoma is apparently just beginning to take place in certain parts of the tumor, but the axillary glands, although much enlarged

from endothelial hyperplasia, show no involvement. This patient is also living without doubt; we heard from her last September in reply to our last letter.

In Case II (511) this same adenoma and the carcinoma were growing side by side in many parts in the bitypic manner already described, and still the axilla was not involved. This patient had a cancer of the uterus when we operated upon her breast. If the uterine tumor had been operable this patient might still be living.

The five cases of adenocarcinoma, which we have very briefly described, resemble in certain respects, and in other respects differ from, the so-called duct cancers. The duct cancers hitherto described have been small tumors, for the most part circumscribed, and resembled sarcomata; macroscopically as well as microscopically the villous nature of the tumor has always been conspicuous. That they bulge on section is frequently noted in the descriptions of these duct cancers; and by most they are said to be soft, very friable, and difficult to cut.

The adenocarcinomata which I have described resembled on section the carcinomata and not the sarcomata; a villous or papillomatous tendency was never apparent and not even suspected from the gross appearances of the freshly cut surfaces. Fine, worm-like cylinders of epithelium could be expressed from some of these tumors, but not from all. All of these new growths infiltrated the surrounding tissues just as carcinoma does. With the microscope the power of the epithelium to make ring-like combinations, as shown in the drawings, was very conspicuous, whereas the tendency to form villous growths was not so evident.

The histological details of these growths are reproduced with most gratifying truthfulness in the plates; and, when a sufficiently high power has been employed, each nucleus has been copied as faithfully as possible.

We have, I think, said enough about these adenocarcinomata to make it clear that they have striking clinical and

histological features in common; but we shall probably not succeed in drawing a very sharp line between this particular variety of adenocarcinoma and certain other adenocarcinomata in our collection. Some of the latter resemble the two cases described by Billroth as cystoadenomata; others, the thyroid gland. In one case the resemblance to the thyroid gland was remarkable.

It is quite likely that some of the little tumors which have been described as duct cancers are early stages of these adenocarcinomata.

We have several times met with just such cases as No. III,—a cyst or cysts with intracystic papillomata, and scirrhus cancer at the base of the villous growth.

Operative Methods.—Our present method of operating for the cure of breast cancer is even more radical than it was at the time of the writer's first publication on this subject. The supraclavicular region is almost invariably cleaned out. To do this we no longer divide the clavicle as we did five or six years ago; for simple division of the clavicle does not facilitate the dissection much, if any, and the removal of a piece of the collar-bone is a procedure which maims without sufficient compensation. If it were very desirable to remove the supraclavicular contents in one piece with the axillary contents and the breast, one might not hesitate to excise, if necessary, even the entire clavicle; but the removal of the supraclavicular fat and lymphatics is best done from within outward and from below upward, for in cleaning large veins like the subclavian and internal jugular the surgeon works to the best advantage if he starts at the vein and works away from it. The subclavian vein being the starting-point in the dissection of both the infra- and supraclavicular regions, it is unnecessary to remove the clavicle and useless to divide it. By elevating the shoulder the clavicle can be raised an inch or more away from the first rib when the operation is so far completed as to make this desirable. The web of fibrous tissue which binds the subclavian vein loosely to the clavicle

is thus spread out, and can be easily removed. The fingers can be passed from the supra- to the infraclavicular and to the subscapular regions under the clavicle, and any fat in the latter region, near the internal or the posterior border of the scapula between serratus magnus and subscapular muscles, which could not be reached well from the axilla can be drawn out through the neck. Dr. Bloodgood, my former house-surgeon, was, I believe, the first to demonstrate the advantages of completing the cleaning out of this postero-internal subscapular region by the supraclavicular route. To excise the supraclavicular tissues we use a vertical incision parallel with the sterno-cleido-mastoid muscle near its posterior border; a few of the posterior fibres of this muscle are divided and the junction of the internal jugular and subclavian veins exposed. At the angle of junction of these veins the dissection is begun. The omo-hyoid is divided at its tendinous part; the two bellies of this muscle being drawn out of the way and serving, in a measure, as retractors.

We have cleaned out the supraclavicular fossa in sixty-seven cases. Cancer was found in the tissues removed twenty-three times, or in 34 per cent. of these cases. In thirty cases there was no cancer, and in fourteen it is still uncertain whether the supraclavicular region was involved or not, because the tissues have not yet been exhaustively studied. Only those familiar with the work can understand the amount of labor implied in the statement that a given mass of the fat does not contain a cancer alveolus.

Not all of the sixty-seven operations above the clavicle were what we call primary; for fourteen of them were performed subsequent to the original operation and because supraclavicular glands could be palpated. Living and apparently free from metastasis three or more years after the primary operation are four cases whose necks were involved and cleaned out secondarily. Of these, two are living and well more than four years after the primary operation, and three and three and a half years respectively after the opera-

tion on the neck. In one of these latter cases I considered the prognosis desperately bad at both the infra- and supraclavicular operations. At the first operation the cancer had infiltrated the axillary fat diffusely, and could, with difficulty, be separated from the subclavian vein; at the second operation the same desperate state of affairs was encountered in the neck. A piece of the clavicle was exsected and a very thorough operation performed. We were pleased to find at the second operation that there was no evidence of recurrence in the axilla. It is now more than three years since the neck operation was done, and the patient, whom I saw a few days ago, feels perfectly well, and has no signs of recurrence or metastasis.

When these statistics were prepared, the neck operation, as we call it, had been performed primarily fifty-three times; in twelve of these cases, about 23 per cent., the supraclavicular tissues were involved.

It is to be hoped that others have reached the conclusion that we should not abandon as hopeless all cases of breast cancer in which there is supraclavicular involvement. Indeed, I fail to see why the neck involvement in itself is more serious than the axillary. The neck can be cleaned out just as thoroughly as the axilla. Dr. Bloodgood, instructor in Surgery, has, on the necks of two patients, done as many as three operations each for glandular involvement, and apparently saved his patients. The additional operations were for glands above and below the region of the neck first attacked. In one of these cases he entered the mediastinum from above to remove a cancerous gland, and had to excise a piece of the innominate vein. Dr. H. W. Cushing, my house-surgeon, has in three instances cleaned out the anterior mediastinum on one side for recurrent cancer. It is likely, I think, that we shall, in the near future, remove the mediastinal contents at some of our primary operations.

As I have said, we clean out or strip the supraclavicular fossa with very few exceptions at the primary operation. It

would be unwise, I think, to postpone this operation until enlarged glands can be palpated above the clavicle, for we not infrequently find in the tissues removed cancerous glands too small or too deeply embedded in fat to have been felt through the skin, and often a large gland or several glands at the junction of the subclavian and internal jugular veins which were too deeply buried behind the clavicle to have been detected before the operation. The axilla offers no criterion from which we might draw inferences as to the condition of the supraclavicular fossa. Sometimes, with an axilla which is involved chiefly in the lower or arm part, and apparently not at all in the upper or subclavian part, we have a neck involved solely at the junction of the internal jugular and subclavian veins. This state of things was present in a recent case in which I had a considerable personal interest. The patient was a young lady whom I was very loath to disfigure, and as the higher or subclavian part of the axilla seemed free from cancer, and nothing suggestive of cancer could be detected in the neck, I said to my assistants that I would not touch the neck. But upon examining the breast and axillary contents removed, I was so much impressed with the unusual malignancy of the little cancer that I returned to the table and stripped the supraclavicular fossa. Several cancerous glands were found at the junction of the great veins and internal to the inferior thyroid artery.

It sometimes happens, on the other hand, that the neck is not involved, although the axilla is a solid mass of cancer. Hence, it would appear that for the present our rule should be, *operate on the neck in every case*. The neck operation should not be postponed for a second act. It can never again be done so well as at the first operation, when the axilla is open, the subclavian vein fully exposed, and the clavicle free. In the main operation we have made some changes. We remove the minor as well as the major pectoral muscle, dividing the insertion of the major and then its origin and the origin of the minor, before we expose the subclavian vein. This vein is first exposed at its inner part, and the axilla

stripped of its contents, and its anterior wall at one time from within outward and from above downward, as heretofore. We have made no change in the skin incision; indeed, I should hardly know how to do so; one must always circumscribe the mass to be excised with a circular or an oval incision, and must make additional cuts to expose axillary and jugular veins. Tumors should never be harpooned, nor should pieces ever be excised from malignant tumors for diagnostic purposes. Think of the danger of rapid dissemination of the growth from injecting cancer of the tongue with cocaine and then snipping off a piece of the tumor with a scissors.

In studying the published histories of cases of malignant tumors, particularly sarcoma, I have been impressed with the great number of cases in which general dissemination of the neoplasm has seemed to follow swiftly upon exploratory incisions.

Breast tumors should not be incised on the operating table prior to their removal. The surgeon must learn to recognize malignant tumors not only with the microscope, but also with his naked eye and fingers.

There are, of course, tumors which cannot be diagnosed until an incision has been made into them or into the axilla. For example, a large benign cyst may have a tiny cancerous spot in its wall, or a very slowly growing carcinoma may be sharply defined or even encapsulated and resemble on palpation a benign tumor. If the surgeon cannot, in a given case, make a diagnosis prior to operation, an exploration of the axilla might help him; if still in doubt, he should excise the breast or, at least, give the tumor a wide berth. If then, on incision, the tumor proved to be malignant, the complete operation should be performed immediately.

Operating for the cure of cancer is a very great labor. We never attempt more breast cancers than one in a day. The operation, including the toilet of the wound and the grafting, requires from two to four hours with highly trained and skilful assistants; it is performed in an absolutely blood-

less manner, and the patient, in consequence, suffers not at all from shock. Three days ago, for example, in a three-hour operation, the patient's pulse ranged from 66 to 70 throughout the entire operation. At all operations a record of the pulse is kept on what we call the *ether chart*, introduced by my house-surgeon, Dr. Cushing. We remove rather more skin than we did originally, and in all cases we graft the wound immediately. Grafts are cut from the patient's thigh as large as or larger than one's hand. A single one of these large grafts may be enough to cover the raw surface. In cutting a graft of this kind the skin is made tense by a board which the operator slides along the thigh just in front of a large amputating knife or catlin. The graft is spread, raw side up, on a piece of rubber tissue, and from the latter is readily transferred to the breast wound. It is finally covered with silver foil and tissue paper, and need not be looked at again for two or more weeks. The silver foil makes an ideal dressing for grafts, very much better than anything else we know of. For several years we hesitated to graft these cases at once, fearing to prolong the operation another half-hour; but now we have become accustomed to these very long operations, and have learned that they may safely be continued almost indefinitely if they are bloodless and if the anæsthetic is properly given.

Results of Operations for Breast Cancer at the Johns Hopkins Hospital from June, 1889, to April, 1898.—During the past two years my assistants, Drs. Finney, Bloodgood, and Cushing, have probably performed the majority of the breast operations; prior to this, almost all of the breast cancers were operated upon by the writer. One hundred and thirty-three cases have been operated upon; seventy-six of these more than three years ago. There have been thirteen (9 per cent.) local and twenty-two (16 per cent.) regionary recurrences. Of the seventy-six cases operated upon three or more years ago, thirty-one (41 per cent.) are living without local recurrence or signs of metastasis; ten died more than three years after the operation, and one as late as five and a half years

thereafter; of these ten, one had a local recurrence. Forty cases, therefore (52 per cent.), lived more than three years without signs of local or regionary recurrence. Some of the ten cases which died may have had at three years signs of metastasis; I cannot make a positive statement as to this point. Thirty-five cases (46 per cent.) died within three years of the operation, and seven of these with local recurrence.